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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,602	12/17/2003	Michael A. Kneissl	115917	5826

27074 7590 11/21/2006

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EXAMINER

GOLUB, MARCIA A

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 11/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/736,602	Applicant(s) KNEISSL ET AL.	
	Examiner Marcia A. Golub	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 and 51-61 is/are pending in the application.
4a) Of the above claim(s) 4-6,9-17,21-24,27,31 and 32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,7,8,18-20,25,26,28-30 and 51 is/are rejected.
- 7) ☒ Claim(s) 52-61 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7, 18, 19, 28 and 29, 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCall (5,343,490) hereinafter '490, and further in view of Kinoshita (6,330,265) hereinafter '265.

Regarding **claim 1**, Fig 8 of '490 disclose "a grating-outcoupled microcavity disk resonator [80], defining a plane [81, 82] and having a substantially smooth curved outer periphery [83] (9/55-56), bounded by reflective walls, around and within which light can circulate (3/36-38); the resonator including at least one grating region [84] disposed in the plane [81] of the grating-outcoupled microcavity disk resonator [80]; the grating region [84] serving to outcouple light circulating within the curved outer periphery into free space modes propagating out of the plane of the resonator." (11/22-23)

'490 does not disclose that the grating region "is a buried grating that has a substantially symmetric profile". However, Fig 2a of '265 discloses a grating with a sawtooth profile located in the waveguide and cladding layers of the laser.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '265 into the device of '490 by making the buried grating with a substantially symmetric profile located in the waveguide and cladding layers for at least the purpose of outcoupling light circulating in both clockwise and counterclockwise directions.

Regarding **claims 2, 7, 18, 19, 28 and 29, 51**, Figs 7 and 8 of '490 and Fig 2A of '265 disclose a grating-outcoupled microcavity disk resonator as described above:

2. "wherein the grating region [10] is a set of periodic features formed in or on a cladding layer [5] of the resonator."

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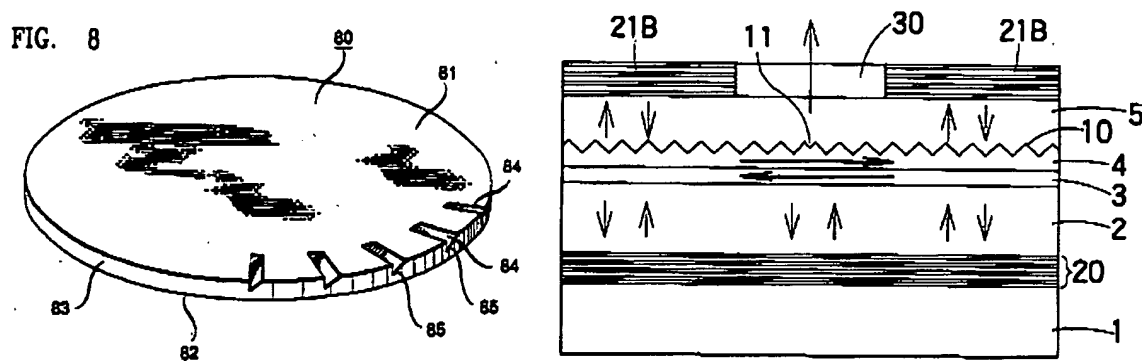
7. "wherein the grating region forms at least a second order grating." (title of Fig 2a)

18. "wherein the grating region [10] is a set of periodic features formed in an upper cladding layer [5] of the resonator."

19. "wherein the grating region [10] is formed in an upper cladding layer [5] and an upper waveguide layer [4] of the resonator."

28, 29. "wherein the grating-outcoupled cavity resonator comprises a heterostructure formed using at least one of InP (claim 28) and InGaAsP (claim 29)." (7/27-29 of '490)

51. "further comprising: a first waveguide layer [72]; a quantum-well active layer [71]; and a second waveguide layer [72] on the other side of the quantum-well active layer from the first waveguide layer."



Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over '490 and '265 as applied to claim 1 above, and further in view of Hwang et al. (6,638,773) hereinafter '773.

Regarding **claim 3**, '490 and '265 disclose a grating-outcoupled microcavity disk resonator as described above, but do not disclose "wherein the periodic features have at least one of a trapezoidal, rectangular, and sinusoidal shape."

However, different shapes of gratings in semiconductor lasers are well known in the art as evidenced by '773 (16/61-65).

It would have been obvious to one of ordinary skill in the art at the time of the invention to make the grating of these known shapes, since it has been held to be within the general skill of a worker in the art to select a known material/element on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*,

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227 F.2d 197, 125 USPQ 416 (CCPA 1960).

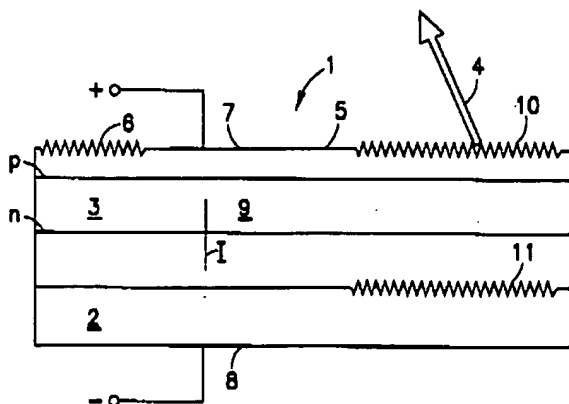
Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over '490 and '265 as applied to claim 1 above, and further in view of Baird et al. (5,559,824) hereinafter '824.

Regarding **claim 8**, '490 and '265 disclose a grating-outcoupled microcavity disk resonator as described above, but do not disclose "that the grating region forms at least a distributed feedback grating."

However, DFB gratings in semiconductor lasers are well known in the art as evidenced by '824 (6/29-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '824 into the device of '490 and '265 by making a grating in the microcavity disk resonator a DFB grating for at least the purpose of controlling the spectral bandwidth and wavelength of the output.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over '490 and '265 as applied to claim 1 above, and further in view of Portnoi et al. (6,219,369) hereinafter '369.



Regarding **claim 20**, '490 and '265 disclose a grating-outcoupled microcavity disk resonator as described above, but do not disclose that the grating is formed of two gratings, one in the top cladding layer and the other one in the bottom cladding layer. However, Fig 1 of '369 discloses: "wherein the grating region [10, 11] is formed in both a top cladding layer [p-type layer] and a bottom cladding layer[n-type layer] of the resonator [1]."

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It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '369 into the device of '490 and '265 by positioning the grating in both the top and the bottom cladding layer for at least the purpose of providing a distributed feedback and increasing output efficiency of the laser.

Claims 25, 26 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over '490 and '265 as applied to claim 1 above.

Regarding **claims 25, 26 and 30**, '490 and '265 disclose a grating-outcoupled microcavity disk resonator as described above, but do not disclose "that the grating-outcoupled microcavity disk resonator comprises a III-V nitride semiconductor heterostructure formed on a substrate (claim 25); wherein the substrate comprises at least one of sapphire, silicon carbide, GaN, AlGaIn, AlN, and silicon (claim 26); wherein the grating-outcoupled microcavity disk resonator comprises a heterostructure formed using at least one of ZnSe, CdS, MgS, MgSe, CdSe, CdTe, ZnO, and MgO" (claim 30).

However, these materials/elements are well known in the art of lasers.

It would have been obvious to one of ordinary skill in the art at the time the of the invention to make the laser of these known materials/elements, since it has been held to be within the general skill of a worker in the art to select a known material/element on the basis of it's suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960).

Allowable Subject Matter

Claims 52-61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose a microcavity disk resonator with the layers and materials disclosed in the claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Contact Info

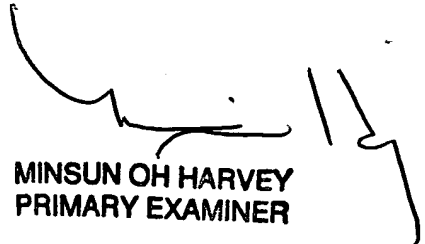
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marcia A. Golub whose telephone number is 571-272-8602. The examiner can normally be reached on M-F 9-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Marcia A. Golub
Assistant Examiner
Art Unit 2828

MAG


MINSUN OH HARVEY
PRIMARY EXAMINER